- ***PROPER MAINTENANCE OF THE HEADSTOCK ON THE RIVETT WATCHMAKER'S LATHE***
- *This guide is intended for the Type 2b lathe (see notes at the end)*
- *Latest revision of this guide: Sunday, August 16, 2026*
- *You will always find the latest revision of this guide here: https://archive.org/details/@cazclocker*

DISASSEMBLY

1. First, take out the drawtube, then remove the brass dust cap around the rear end of the spindle -- it's only a firm push fit onto the headstock casting, and you can pull it off, or if necessary gently pry with a dull knife like a watch-case opener.

2. When the drawtube and rear dust cap comes off, you will be able to see a large-headed screw beneath the spindle. Loosen this screw two or three turns. This will retract the rear spindle bearing in its tapered seat, and make it easier for the spindle to be removed or replaced. NOTE: the head of the large-headed screw measures 0.280" wide – but the slot is 0.100" deep (a tenth of an inch) and between 0.022" and 0.024" wide. For years, I've just used a large jeweler's screwdriver because the hollow ground tip reaches deep enough to make rotating the screw fairly easy. Recently I encountered a Rivett "Universal Head" (serial #45) in which the large-headed screw was unusually difficult to turn. I found that a gunsmith's screwdriver – a Forster #13 – did the job beautifully. Slotted screwdrivers for gunsmithing are typically hollow ground, and reach further into the slot than a normal flat ground one. I got my Forster #13 on eBay.

3. Now look at the spindle between the large diameter end of the pulley and the rear bearing -- there's a circular collar on the spindle with some holes in it, and one of these holes should have a small slotted screw in it. Take a small screwdriver and loosen this screw a turn or two.

4. Then, insert a pin into one of the plain holes in the collar (I use a piece of 5/64" drill rod*) and hold the end of the pin while you rotate the pulley clockwise (looking at the spindle from the back). The collar will unscrew from the fine thread cut on the spindle, and will retract away from the back of the pulley. When the collar is unscrewed several complete turns, it will make contact with the bearing housing behind it; as you continue to rotate the pulley, the collar pushing on the housing will begin to force the spindle forward. *NOTE: on my main Rivett watchmaker's lathe which I use almost daily (serial # 2138, permanently mounted on my bench), I use a piece of 3/32" drill rod instead of 5/64" because I find that it fits the collar's holes better. On my other Rivett watchmaker's lathes, 5/64" drill rod *may* work just fine. NOTE: instead of drill rod you can use the shank end of a drill bit.

5. A few more turns of the pulley (while holding the pin in the hole in the collar) and the collar will reach the end of the threaded part of the spindle and work its way loose. At this point, you should be able to push (if necessary, fairly firmly, but just with your thumb) the back end of the spindle, causing it to slide forward through the bearings and through the pulley. Sometimes dried oil or (rarely) rust will make it difficult to force the spindle out -- if necessary you can tap the back end of the spindle with a soft hammer -- I use a plastic-headed one.

6. Usually, once the spindle has moved about half an inch it becomes quite free and you can pull it out completely, but occasionally not. If that's the case you can continue tapping with the soft hammer until the rear end of the spindle disappears inside the rear bearing housing. To continue tapping further, you'll need a piece of soft material (you can use a piece of rod made of either brass, Delrin or nylon – I use ½" Delrin rod) just smaller in diameter than the back end of the spindle – I believe 7/16" is just right. Normally this isn't necessary -- the spindle usually just pulls out, and the pulley and collar drop free.

7. Now loosen the large-headed screw further, and the rear bearing will slide out. You can also take off the front brass dust cap, but do not attempt to remove the front female bearing -- it is pressed into the headstock casting. Clean everything very carefully -- I use Coleman camping fuel, but I have friends who swear by acetone or kerosene -- and dry everything with dust-free paper towels.

8. Inspect all the bearing surfaces for dried oil, corrosion, or other defects. There is not much you can do if there are large scored marks on any of the surfaces, but dried oil can often be removed with a BRASS wire brush and solvent, and slight corrosion or very light scoring damage may be corrected by very careful rubbing with an Arkansas stone. If you do any corrective work of this kind, be very sure to clean all the abrasive dust away or the problem will get worse rather than better.

REASSEMBLY

1. To reassemble, lubricate the spindle where the pulley will go with a little light oil, then slide the spindle through the front bearing, put the pulley (WITH THE BELT AROUND IT!) and the collar into the gap between the two bearing housings, and carefully slide the spindle through them. The pulley is located on a keyway in the spindle, so you'll need to rotate it to get the key aligned properly. As you push the spindle through the collar, it will eventually reach the threaded part of the spindle and you'll need to engage your piece of drill rod in one of the collar holes. While you hold your piece of drill rod with one hand, use your other hand to rotate the pulley *counterclockwise* (looking at the spindle from the back) to screw the collar on. Stop just before the front of the pulley makes contact with the inner face of the front bearing housing.

2. Now you need to replace the rear bearing and the large-headed screw, making sure that the small indexing nub on the bearing fits into both the recess in the head of the screw and the keyway in the headstock casting. The slit in the bearing must be at the top, and the small indexing nub must be at the bottom. Tighten the screw a few turns, but stop before you have contracted the bearing all the way to where it makes firm contact with the spindle.

3. At this point you need to lubricate the bearings. Any good quality thin instrument oil can be used (maybe even "3-in-1" or sewing machine oil, though I'm not endorsing them) but I've been using Mobil-1 5W-30 synthetic engine oil for several years now, and like it very much. A quart of this, for about $8, will last you many lifetimes. Put about two or three drops in each oiler, and replace the caps. Give the spindle a gentle turn or two to distribute some oil onto the working surfaces. Before beginning a work session, you should always give the spindle a couple of turns with your fingers for the reason previously stated. ***About the little oil cups on the top of the headstock:*** *the brass oil cups are extremely well-made but the tiny brass lids that press onto each cup are prone to being dropped and lost. I've been using the following technique that prevents the lids from getting lost on my workshop floor. I simple store them elsewhere and pack the cups with a piece of type F1 felt cord. Type F1 felt is a dense wool felt made for oil wicking, so it will retain oil and allow it to discharge very slowly into the lathe bearings. The inside diameter of the oil cups measure 0.226", so a single plug of 3/16" diameter F1 cord packed into each oil cup will work well. As of this writing, McMaster-Carr carries 3/16" diameter F1 felt cord under the part number **8767K226** for five feet, which is the shortest length they sell. Five feet is much more than you'll ever need since each cup will only take a piece about 1/8" long. Once you have both cups packed with F1 felt cord, you'll need to charge the felt plugs with your oil of choice. After the initial oil charging of the cord plugs, you can quit using the little brass lids and proceed to use your lathe normally. I just refresh the oil with a drop or two of oil before using again. When using your lathe for several hours, I would refresh the felt plugs with another two drops every couple of hours. The felt not only retains oil and discharges it gradually, but it also prevents contamination from dust or swarf from entering the bearings.*

4. Now you need to adjust both bearings, working alternately between the front and rear bearings until you have the free-but-precisely-running spindle you want. The front bearing is adjusted by turning the collar with the holes behind the pulley in a clockwise direction, which pulls the spindle down into the front bearing. The rear bearing is adjusted by tightening the large-headed screw, contracting the tapered bearing in its tapered seat. In either case, if you go too far, the spindle will lock up, and you'll need to loosen the adjustment you just overdid, and try again. I use a dial indicator on the front of the spindle, and aim for an endshake of about .0005" (half a thousandth of an inch). For measuring endshake, use a dial indicator (or dial test indicator) on the outermost rim of the

spindle's mouth – then check by alternately pushing on the back of the drawtube and the front of the spindle's mouth. Without this aid, you'll need to work by feel. If you just lock up the spindle with the front bearing adjustment, then back off the collar by maybe 1/10th of a turn, then give the rear of the spindle a tap with your plastic hammer, then tighten the large-headed screw until you can *just* begin to feel the spindle getting stiff – you'll be close.

5. **NOTES ON BEARING ADJUSTMENTS:** The main adjustment you need to be concerned with is the front bearing adjustment, which is the one that is made by turning the drilled collar behind the pulley. You should ***start***, and ***finish*** with it. Once you've almost fully drawn the spindle in with the drilled collar, you can experiment with tightening the screw that compresses the rear bearing sleeve into its housing in the headstock casting, until the drag is just perceptible, then backing off very slightly. Once you have the rear bearing more or less correct, it shouldn't have any further effect on the front bearing clearance. But remember, the final test is whether the front bearing heats up in use -- if so, it is too tight. For most turning, you don't need clearance that fine -- leave room for the oil. If the lathe binds up, something is definitely too tight, and checking for warmth is the best way to find out which bearing is the culprit.

The first time you do this, it will take a long time, but as you get familiar with it, the time taken diminishes to maybe ten minutes. You should do it fairly frequently -- at least once every few months, and much more often if you do any grinding or lapping in your lathe, to keep the bearings in good shape. Oil frequently -- at least once every hour of use, and before using the lathe any time it has been sitting for any length of time. The bearings have lasted a century, generally with no detectable wear, but abrasive grit or running dry will ruin them.

SOURCE NOTES:

1. Manufacturing dates cited in the title of this document are from the "Watchmakers' Lathe" section of the well-known website http://www.rivettlathe.com/, managed by Tom Hammond & Greg Dermer.

2. My own measurements taken on June 28th 2025 showed the following dimensions of my Rivett 2b headstock pulley:
   Overall length from indexing ring to front of pulley: 1.352"
   First ring O.D.: 2.333"
   Second ring O.D.: 2.230"
   Third ring O.D.: 1.908"
   Fourth ring O.D.: 1.571"

Things to know about the Rivett "model 2b" Watchmaker's Lathe:

- Collet body O.D.: 0.300" (+0.0000" -0.0005") See downloadable 2OS collet dimensions, available elsewhere on my Internet Archive section.
- Bed length: 11 ½" (11.5")
- Headstock: Hard steel cone bearing
- Tailstock: Plain
- Swing: 4 3/8" (4.375")
- Center height: 2 3/16" (2.1875")
- Distance between centers: 3 ¾" (3.75")
- Finish: Nickel
- Tool rest: Tip-over with binding lever
- It's an excellent idea to occasionally clean out any buildup of debris from the interior channels directly underneath the ways, where the "button" of the tailstock's clamping mechanism is located. Debris can obstruct the movement of the clamping "button". Access the channels from the tailstock end of the lathe bed. I use a piece of brass strip from K&S Precision Metals but anything will work as long as it's 12" or longer.

The evolution of the E. Rivett watchmaker's lathe, by "type":

The term "type" as it pertains to Rivett's watchmaker's lathes is not official Rivett nomenclature. Instead, it is just a designation arrived by Tom Hammond, my personal friend for many years (R.I.P.). Tom was a true historian of the Rivett company and its wonderful products. Most Rivett fans use this designation, so maybe that makes it official. See the website created by Tom Hammond and Greg Dermer: https://www.rivettlathe.com/

- *Type 1a2 watchmaker's lathe, made from 1887 to early 1890s.*
- *Type 1b watchmaker's lathe, made from 1890s to about 1895.*
- *Type 2a watchmaker's lathe, made from about 1895 to 1901.*
- *Type 2b watchmaker's lathe, made from 1902 to 1905.*
- *Type 2c, made from 1905 to about 1910(?).*
- *Type 2d, if it exists, would be identical except engraved "Rivett Lathe & Grinder Co.".*